PROBABLE CAUSE OF THE ELECTRIC STORMS IN WESTERN KANSAS.

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A plausible explanation of the electric storms in western Kansas (described in the Monthly Weather Review of June, 1912) is suggested in articles by Prof. W. A. Douglas Rudge, in Nature of March 13, 1913, and The London, Edinburgh, and Dublin Philosophical Magazine of April, 1913.

At Bloemfontein, South Africa, which has an elevation and climate similar in many respects to that of western Kansas, Prof. Rudge was able to demonstrate that the surface of the ground, which is of siliceous nature, as is the soil of western Kansas, was charged with positive electricity, and that during a dust storm the particles of dust were charged similarly, while the air itself was charged with negative electricity, sometimes giving rise to values exceeding 500 volts per meter.

Prof. Rudge was able to devise an electrical apparatus by which charges of both positive and negative electricity were obtained during a dust storm. The essential parts were a small insulated disk coated with radium and attached to a wooden rod about 2 meters in height, a 5-gallon petrol can with both ends removed, and a fine wire gauze fitted over one end, and a pair of insulated spheres to serve as dischargers.

The petrol can was placed upon an insulated rod about 20 centimeters above the ground, with the open end directed toward the onrushing dust. The radium disk was, of course, connected electrically with one spherical discharger and the can with the other.

A considerable portion of the dust blowing into the can was retained, and the charge of electricity it carried was given up and conducted to the insulated sphere. This was invariably found to be positive. The radium conductor, however, took the negative potential of the air, so that the two balls acquired opposite charges and "a torrent of sparks as continuous as that furnished by an induction coil passed between them." On some occasions sparks 1.5 centimeters (0.6 inch) in length were obtained "showing at least 40,000 volts when the apparatus was set up in the open veldt."

So far as known no actual measurement of the electrical charge carried by the dust and air during an electric storm of the kind described has ever been made in the Plains country of the United States. This is partly because the irregular occurrence of these disturbances makes it impossible to anticipate them and partly because well-equipped physical laboratories are lacking in the region affected.

When we stop to consider that these western plains disturbances occur during dry weather, and with at least moderately high winds which keep the air filled with flying dust, and are never accompanied by precipitation, it seems evident that it is the electrical charge carried up by the dust that accounts for the unusual phenomena seen at such times.

It will be recalled in this connection that the most pronounced evidences of the electrical phenomena in western Kansas were observed on windmills mounted on wooden towers and barbed-wire fences fastened to wooden posts. Each of these classes of objects would be partially insulated from the earth and exposed freely to the dust particles that carry the electrical charges.

It would certainly be worth while to install somewhere in the region where these storms occur an apparatus similar to that used by Prof. Rudge and give this theory a thorough test. From the broad scope of dry, dusty country over which the winds sweep east of the foothills of the Rockies it need not be at all surprising if voltages several times those observed at Bloemfontein might occur in western Kansas.

It is altogether possible that such an investigation would determine why all dust storms in the West are not accompanied by the pronounced electrical phenomena, and how well founded is the general belief that growing vegetation is often severely damaged by the electrical discharges.